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HELMINTHOLOGICAL ABSTRACTS

incorporating

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HELMINTHOLOGICAL ABSTRACTS

INCORPORATING BIBLIOGRAPHY OF HELMINTHOLOGY

FOR THE YEAR 1958

Vol. 27, Part 5/6

342—Acta Pharmacologica et Toxicologica. Copenhagen.

- a. PAASONEN, M. K. & VARTIAINEN, A., 1958.—“Pharmacological studies on the body wall musculature of cat tapeworm (*Taenia taeniaeformis*).” **15** (1), 29–36.

(342a) Lengths of about 12 proglottides of *Taenia taeniaeformis* were suspended in Locke solution at 37°C. and their movements recorded on a smoked drum. Air was bubbled through the bath. Other lengths of worm were “denervated” by cutting off the lateral portions; these preparations had very little spontaneous activity. Drugs were added to the Locke solution in the bath and the effects on intact and denervated preparations were compared. Adrenaline, isoprenaline and histamine, which are highly active on mammalian plain muscle, had little effect on the tapeworm; 5-hydroxytryptamine sometimes stimulated denervated preparations. Acetylcholine caused a relaxation which was potentiated by physostigmine and antagonized by atropine, but not by hexamethonium nor by competitive or depolarizing drugs which block neuromuscular transmission in mammalian muscle. Benzoylcholine was antagonized by hexamethonium but nicotine was not; papaverine and barium chloride had no action. The anthelmintic drug methyldiethanolamine flavaspide caused a long-lasting contraction. L.G.G.

343—Acta Physiologica Sinica.

- a. CHU, C. C. & TING, K. S., 1958.—[Studies on antihelminthic drugs. XIV. Experimental therapy with Sb-II in monkeys.] **22** (4), 343–348. [In Chinese: English summary p. 348.]

(343a) In previous reports, the authors have described the effect of Sb-II on white mice and rabbits infected with *Schistosoma japonicum*. The present report deals with the effect of Sb-II on monkeys. Before the experiment, 12 apparently healthy monkeys were studied for their respiratory rate, heart rate, blood pressure, rectal temperature and blood counts. The experimental drug Sb-II is a pentavalent antimonial salt of stibonic acid. Intravenous injections at the daily dosage of 10 mg. per kg. in monkeys for three to six weeks produced no cough, nausea, vomiting, anorexia or other reactions. Likewise, Sb-II had no significant influence on the respiration, blood pressure, ECG, temperature and the blood cell counts. In the experiment, five monkeys were each infected with 300 cercariae of *S. japonicum*. Beginning on the 43rd day after the infection, Sb-II was given intravenously in three monkeys at a dose rate of 10 mg. per kg. per day for three weeks. The remaining two monkeys served as controls. After a holding period of another four weeks, the monkeys were autopsied. There were 0, 1 and 13 degenerated schistosomes respectively in the three monkeys of the medicated groups, while those of the control group had 81 and 138 schistosomes respectively. Thus the therapeutic effect of Sb-II was remarkable. The toxicity of Sb-II was rather low. Drug tolerance to Sb-II developed quickly in monkeys which showed no toxic manifestations after a course as long as six weeks. Hence Sb-II is recommended for clinical trial on those patients in whom intensive treatment with tartar emetic is contra-indicated.

L.S.Y.

344—American Journal of Clinical Nutrition.

- a. DEMARCHE, M., 1958.—“Effect of dietary protein on blood regeneration of anemic patients suffering from parasitic infestation. Preliminary report.” **6** (4), 415–421.

(344a) As a result of studying 51 patients suffering from ancylostomiasis, Demarchi, working in Baghdad, concluded that in severe ancylostome anaemia, a high protein diet is more effective in treatment than a qualitatively similar low protein diet. Difference in the iron

content of the two diets was counteracted by the oral administration of 2 gm. of ferrous sulphate daily to all the patients. The effect of worming during the experimental period on increase of red blood cell count and haemoglobin level and on the type of anaemia in the two groups of patients is discussed. The paper is accompanied by seven tables presenting the dietary and haematological data.

J.M.W.

345—Anais do Instituto de Medicina Tropical. Lisbon.

- a. MORAIS, T. DE, 1958.—“Subsídios para o estudo da prevalência e distribuição das parasitoses intestinais no Distrito do Niassa (A.O.P.).” **15** (3), 621–630. [English & French summaries pp. 628–629.]
- b. MORAIS, T. DE, 1958.—“Subsídios para o estudo da prevalência e distribuição das parasitoses intestinais no Distrito de Moçambique (A.O.P.).” **15** (3), 631–638. [English & French summaries p. 638.]
- c. MORAIS, T. DE, 1958.—“Subsídios para o estudo da prevalência e distribuição das parasitoses intestinais no Distrito de Cabo Delgado (A.O.P.).” **15** (3), 639–646. [English & French summaries pp. 645–646.]
- d. HERVÉ, A. & PIGANIOL, G., 1958.—“Données récentes dans la bilharziose urinaire.” **15** (3), 647–677. [English & Portuguese summaries p. 676.]

(345a, b, c) In these three papers de Morais records the results of his examination, by the simple sedimentation method of Hoffman, Pons & Jenner, of single stool specimens from African children of both sexes in northern Mozambique. The children were divided into the age groups 0–4, 5–9, 10–14 and 15–19 years, but most of those examined were under fourteen years old. The helminths found were Ancylostomidae [species not stated], *Trichuris*, *Ascaris lumbricoides*, *Strongyloides*, *Enterobius*, *Dicrocoelium dendriticum*, *Taenia* spp., *Hymenolepis nana*, *Diphyllobothrium*. Tables, maps and diagrams show the incidences of these species in the age groups, sexes and districts visited. There was no relation in any area between the incidence and the age or sex of the children examined and in all three areas hookworms were the commonest helminths found. In the Niassa district 80% of the 380 children examined were infected and 43·4% harboured more than one species of parasite. Hookworms were found in 36·8%. In the Mozambique area 83·16% of the 980 children examined were infected; 51·82% harboured more than one species of parasite, especially in the Ribaué district, where 57·5% harboured more than one species. Hookworms were found in 46·73%. In this area the highest incidences were in Mozambique Island (100%) and Mogincual (92·5%). In the Cabo Delgado district 82·97% of the 740 children examined were infected and hookworms were found in 43·24%; 51·75% harboured more than one species. Findings relative to *Schistosoma mansoni* are to be published in another paper.

G.L.

(345d) Hervé & Piganiol describe in considerable detail the pathology of 100 cases of urinary schistosomiasis. They describe the lesions most frequently found in the bladder, the complications involving the ureters and kidneys, and complications involving the male genital system. Considerable space is devoted to the crystalline urine deposits encountered in many of the cases.

C.A.W.

346—Annales du Musée Royal du Congo Belge. Série in 8vo, Sciences Zoologiques.

- a. EZZAT, M. A. & TADROS, G., 1958.—“A contribution to the helminth fauna of Belgian Congo birds.” **69**, 81 pp.

(346a) Ezzat & Tadros report on a collection of helminth parasites from 52 species of birds of the Belgian Congo. Four species of cestodes (two new), 37 of nematodes (seven new) and three of acanthocephalans were found. *Idiogenes numidae* n.sp. from *Numida meleagris marchei* is the first species of the genus reported from a galliform bird. The alternate genital pores differentiate it from all but *I. otidis* and from this species it may be distinguished by the cirrus pouch which is four times as large, the number of testes being almost double, the vagina without coils, the smaller rostellar hooks and the larger size. *Ascometra turturi* n.sp., from one specimen in *Turtur chalcospilos*, is much shorter than *A. vestita* and has fewer testes. *Porrocaecum hagedashiae* n.sp., from *Hagedashia hagedash*, resembles *P. serpentulus* and *P. reticulatum* most closely but is differentiated from them by the absence of dentigerous ridges, the presence

of short lateral membranes and the small eggs. The account is based upon one female specimen. *Habronema bambesae* n.sp., from an unidentified bird, lacks cervical alae and has a posteriorly situated vulva but may be distinguished from other species with these characters by the fringed teeth on the anterior margin of the central lobe of the lateral lip and the arrangement of the caudal papillae in the male. *Oxyspirura congolensis* n.sp. from *Numida meleagris marchei* and from a honey-bird is described and differentiated from *O. mansoni* and *O. baskakowi*, the two other species with four pairs of pre-anal and two pairs of post-anal papillae. *Serratospiculum lii* n.sp., from *Falco peregrinus calidus*, is compared with and differentiated from *S. turkestanicum*, *S. helicinum* and *S. chingi*. *Monopetalonema papillosa* n.sp., from *Megacyrle maxima*, closely resembles *M. alcedinis* but is distinguished by eight instead of four cephalic papillae in the external circle, the more anterior position of the vulva and the form of the left spicule. *Chandlerella ghesquieri* n.sp. from *Scotornis climacurus* resembles somewhat *C. bosei* but differs from it in the number and arrangement of the male caudal papillae, longer spicules and presence of knobs on the tail tip. *Lemdana dartevellei* n.sp., from two unidentified birds, differs from *L. limboonkengi*, *L. behningi*, *L. lomonti* and *L. urbaini* by being opisthodelphic and from *L. marthae* by the form and length of the spicules which resemble those in *Wuchereria*. Notes and measurements are given for the remaining cestode, nematode and acanthocephalan species. Three species are recorded for the first time from birds, namely: *Oochoristica truncata* from *Sphenorhynchus abdomini*, *Rhadinorhynchus* sp. from *Hagedashia hagedash* and *Streptopharagus pigmentus* from *Lamprocolius splendidus* but Ezzat & Tadros consider these records most probably accidental.

I.C.W.

347—Annual Review of Microbiology.

- a. FAUST, E. C., 1958.—“Parasitic diseases of man (recent).” **12**, 103-126.

(347a) Faust reviews (*inter alia*) recent developments in knowledge of helminths producing human disease with particular reference to larva migrans (which he divides into cutaneous, produced by hookworms and *Strongyloides*; visceral, produced by *Toxocara canis*; filarial due to *Dirofilaria*; and spiruroïd), reservoir hosts of human filarial worms, axenic *in vitro* development of nematode parasites, schistosomiasis, schistosome dermatitis and *Echinococcus multilocularis*.

J.M.W.

348—Archives des Maladies du Coeur et des Vaisseaux.

- a. GIRAUD, G. ET AL., 1958.—“Cardiopathie filarienne. Étude hémodynamique.” **51** (6), 546-557.

(348a) A patient with cardiac insufficiency and tissue eosinophilia was treated with metacortandracine. The treatment resulted in regression of the cardiac insufficiency and allergic processes, but a state comparable with Loeffler's fibroplastic endocarditis persisted. The significance of these findings in relation to cardiac disease of filarial origin is discussed.

W.A.F.W.

349—Bombay Veterinary College Magazine.

- a. RAO, S. R. & BHATAVDEKAR, M. Y., 1958.—“*Oesophagostomum bhandarai*, a new species of *Oesophagostomum* from a goat in Vidarbha Region together with remarks on closely related species.” **7**, 6-8.
 b. RAO, S. R. & BHATAVDEKAR, M. Y., 1958.—“On a record of the occurrence of *Thysanosoma actinoides* the fringed tapeworm of ruminants in India.” **7**, 15.
 c. MOORE, E. N., 1958.—“Let's reduce worm losses.” **7**, 16-17.
 d. PUROHIT, B. L., 1958.—“A record of onchocerciasis with nodules in an unusual situation in a bull.” **7**, 18-20.

(349a) In *Oesophagostomum bhandarai* n.sp. from a goat slaughtered at Bhandara in Vidarbha, Bombay State, the male is 14 mm. to 15.5 mm. and the female 15 mm. in length. This new species is differentiated from two closely allied species which also occur in goats in India. From *O. columbianum* it differs in having a well defined cephalic inflation and a broad external leaf crown of only ten coarse elements and from *O. indicum* in that the internal leaf

crown does not form a wavy line across the anterior end of the shallow mouth capsule. Moreover the cervical papillae are situated behind the middle of the oesophagus and the spicules are longer measuring 1·47 mm. to 1·6 mm. in length. The anterior end of an adult worm and the tail of the male are figured.

R.T.L.

(349b) *Thysanosoma actinoides* was identified on post-mortem examination of a ram imported into India from the U.S.A. for breeding purposes. This infection is not recorded for India and the need for more careful inspection of animals is stressed.

G.I.P.

(349d) Examination of two or three nodules recovered from the pericardium and pleura of a bull revealed the presence of worms. All of the worms were females and some of them contained developing eggs, other eggs with fully formed larvae and still others contained fully formed larvae hatched out of the eggs but still in the parent's body. The possibility of the presence of three different worms is suggested. Advanced putrefactive changes were observed in the nodules as well as in the heart, liver and spleen.

N.J.

350—Bulletin de la Société de Pathologie Exotique.

- a. GALLIARD, H., 1958.—“Allocution de M. le Professeur H. Galliard.” [Presidential address.] **51** (5), 679–694.
- b. POIRIER, A. & TRÉGUIER, J., 1958.—“Leucose aiguë au cours d'une affection bilharzienne à *S. mansoni*.” **51** (6), 901–903.
- c. MARILL, F. G., 1958.—“Richesse en oeufs des pontes de *Planorbis glabratus*, en Guadeloupe au cours de la saison sèche.” **51** (6), 903–908.
- d. TOUMANOFF, C., 1958.—“Filariose humaine et sa transmission dans la Basse-Guinée (Estuaire du Rio Nunez).” **51** (6), 908–912.
- e. HUSSON, R. A. & SCHNEIDER, J., 1958.—“La réaction de fixation du complément dans le diagnostic des filarioSES.” **51** (6), 960–967.
- f. GRENIER, P. & MOUCHET, J., 1958.—“Premières captures, au Cameroun, d'une simulie du complexe *neavei* sur des crabes de rivières et de *Simulium berner* Fréeman sur des larves d'éphémères. Remarques sur la signification biologique de ces associations.” **51** (6), 968–980.

(350a) In this review of the tropical diseases of man which have comprised the activities of the Société de Pathologie Exotique in the last 25 years, Galliard includes several helminthic diseases, among them the filariases, the intestinal helminthiases and schistosomiasis. He reviews in a very general way their importance, pathology and control.

M.MCK.

(350b) Poirier & Tréguier report from Madagascar a case of acute leukaemia in a patient who five years previously had a dysenteric-like syndrome, possibly bilharzial in origin. On admission to hospital total leucocytes were over 100,000 per cu. mm. with many leucoblasts, red cells were 2·9 million per cu. mm. and the haemoglobin level was 25%. Ova of *Schistosoma mansoni* were found in the faeces. The patient died one month later. At autopsy numerous *S. mansoni* ova were found in the liver, pancreas, splenic lymph glands and other organs. It is suggested that the circulatory disequilibrium caused by the leukaemia could explain the migration of the ova into the different viscera.

W.K.D.

(350c) Marill reports the findings of an investigation to determine the egg-laying capacity of *Australorbis glabratus* during the dry season in Guadeloupe. Ten localities were kept under observation and a total of 674 egg masses were examined. The results are tabulated in full in the paper. The most important facts emerging from the investigation are (i) that the greatest number of eggs are laid in masses containing from 26 to 45 eggs each, (ii) that more masses containing 26 to 30 eggs were found than in any other size group and (iii) that an appreciable difference could be demonstrated in the mean number of eggs per mass in different populations.

C.A.W.

(350d) This report deals especially with the area near the River Nunez estuary, French Guinea. Investigation showed that the principal anthropophilic mosquitoes were *Anopheles gambiae melas*, and *Mansonia uniformis*. Examination of 250 night blood films from the coastal area showed 12 *Wuchereria bancrofti* and five *Acanthocheilonema perstans* infections. Dissection of captured mosquitoes on the coast showed one out of 34 *Anopheles gambiae* positive, and three out of 32 *M. uniformis*. In the north-east region three out of 34 *M. uniformis* were positive. This

latter species is a voracious biter especially at night, and is by far the more important vector of human filariasis.

W.K.D.

(350e) The complement fixation test using a mixed group antigen made up of alcoholic extracts of *Dracunculus medinensis*, *Dirofilaria immitis*, *Litomosoides carinii* and *Dipetalonema vite* was tested on 77 patients. 45 were positive according to the criterion used by the authors. Of these 45, 35 were considered as being infected with *Loa loa*. Three were also definitely infected with *Acanthocheilonema perstans*, and four showed some evidence of this infection. In ten the intradermal test with filarial antigen was positive but no microfilariae were found. In ten others the diagnosis was made without the complement fixation test. In 32 patients with negative complement fixation, at least 12 were proved positive by other methods. The authors conclude that the test is not of great value for diagnosis.

W.K.D.

(350f) This is the first report of the capture of a simuliid of the *Simulium neavei* complex in West Cameroons, West Africa. Out of 30 (unidentified) river crabs, three carried simuliid larvae on the carapace. The female imago resembled a mixed *nyasalandicum-woodi* type. In West Africa only *Simulium berneri* is known to live in association with ephemерid larvae of the genus *Elassoneuria*. The biological significance of this association is discussed and it is suggested that because of positive rheotropism and the need for oxygen and nourishment something approaching parasitism has developed.

W.K.D.

351—Bulletin de la Société des Sciences et des Lettres de Łódź. Classe III de Sciences Mathématiques et Naturelles.

- a. PAWŁOWSKI, L. K., 1958.—“Hirudinées dans la collection du Docteur K. Lindberg.” 9 (11), 1-13.

(351a) In this report on Lindberg's collection of leeches, Pawłowski records *Glossiphonia annandalei* and, for the first time, *G. heteroclitia* from India; *Hemiclepsis marginata* and *Helobdella stagnalis* from Afghanistan; *Haemopis sanguisuga* from Greece and *G. complanata* from France.

M.MCK.

352—Bulletin of the World Health Organization.

- a. MUIRHEAD-THOMSON, R. C., 1958.—“The ecology of vector snail habitats and mosquito breeding-places. The experimental approach to basic problems.” 19 (4), 637-659.
 b. HAIRSTON, N. G., HUBENDICK, B., WATSON, J. M. & OLIVIER, L. J., 1958.—“An evaluation of techniques used in estimating snail populations.” 19 (4), 661-672.

(352a) Muirhead-Thomson presents a comparative review of the ecology of the breeding places of the anopheline mosquito vectors of malaria and the molluscan intermediate hosts of schistosomiasis. The author shows the similarity in the general problems facing both medical entomologists and malacologists and draws attention to the large amount of literature which is available in the field of mosquito ecology which could provide a great deal of information of use to those concerned with snail ecology. Particular examples are given with respect to water temperature, oxygen tension, water movement, pollution and salinity. A short discussion on sampling methods for determining population densities in both fields of work is included. c.w.

(352b) Hairston *et al.* discuss the efficiency and application of techniques for estimating the density of snail populations. The techniques are divided into direct and indirect methods and the first of these is subdivided into two groups, exhaustive and fractional. The direct techniques involve the use of sampling devices such as tubes, quadrats, grabs, scoops and nets while the indirect methods are those based on recapture of marked snails or the use of traps. The conclusion is reached that it is not possible to develop a uniform method for sampling snail populations and that the method selected in any given instance must be the one best suited to the physical conditions of the habitat, the facilities available and the degree of accuracy required. While trapping methods may be adequate for estimating molluscicidal activity there is no doubt that one of the direct exhaustive techniques must be used for accurate ecological work. c.w.

353—Canadian Insect Pest Review.

- a. BROWN, G. L., 1958.—“Notes on some plant parasitic nematodes encountered in Canada in 1957.” **36** (1), 122–123.
- b. REID, R. W., 1958.—“Mountain pine beetle (*Dendroctonus monticolae* Hopk.)” **36** (2), 146–147.
- c. ANON., 1958.—“Border interceptions.” **36** (2), 155–157.
- d. ANON., 1958.—“Border interceptions.” **36** (3), 187–188.
- e. ANON., 1958.—“Border interceptions.” **36** (6), 278–279.
- f. ANON., 1958.—“A stem nematode on alfalfa (*Ditylenchus dipsaci* (Kuhn) Filipjev, 1936).” **36** (7), 283.
- g. ANON., 1958.—“Import interceptions of interest.” **36** (7), 297–299.

(353a) *Heterodera trifolii* which is wide-spread in Canada was found to reproduce parthenogenetically in the green-house. White dutch clover, *Trifolium repens*, was a good host of this nematode while *Vicia villosa* and *T. fragiferum* were less susceptible. Six other named legumes appeared to be resistant. *Meloidogyne hapla* was found attacking rose, peony, delphinium, alsike clover, vetch and strawberry. *M. incognita* attacked gloxinia tubers, rose, *Cissus discolor* and *Hava* vine. *Dolichodorus* sp. was found attacking wild rice roots. *Pratylenchus pratensis* was encountered 30 times in collections from various field crops whereas *P. penetrans* was only encountered seven times from similar habitats. Damage to chrysanthemum by *Aphelenchoïdes ritzema-bosi* was common in Ontario. [Most of the records given in *Canadian Insect Pest Review* **35** (2), 150–156, **35** (6), 249 and **35** (7), 287–290, are also repeated in this report.]

D.J.H.

(353b) At least seven species of nematodes were found to be associated with the mountain pine beetle in the East Kootenay region of British Columbia. *Sphaerularia hastata* Khan was the most important nematode found affecting the beetles; it was present in egg niches and in the digestive tract, body-cavity and reproductive organs of adults.

D.J.H.

(353c) Root-knot nematodes, *Meloidogyne* spp., were intercepted on several different plants including *M. hapla* and *M. incognita* on rose, *M. arenaria* on weigelia and *M. javanica* on tomatoes. *Xiphinema diversicaudatum* was found attacking the rose variety Goldilocks. Several plant-parasitic nematodes were present in soil from Scots pine transplants from Holland. D.J.H.

(353d) Several shipments of tomato plants were infested with root-knot nematodes, *Meloidogyne* spp., including *M. javanica*, *M. incognita*, *M. hapla* and *M. arenaria*. *M. hapla* was also found on viburnum and strawberry roots, *M. arenaria* on weigelia, *Rosa multiflora* and primula. Shipments of nursery stock from Denmark were destroyed because of the presence of parasitic nematodes in the soil about their roots.

D.J.H.

(353e) Soil from a holly plant intercepted from England contained nematodes including *Rotylenchus robustus* (formerly *Hoplolaimus uniformis*). D.J.H.

(353f) An infestation of *Ditylenchus dipsaci* on lucerne is reported from Southern Alberta where it has not been seen since minor outbreaks in 1950–52.

D.J.H.

(353g) *Pratylenchus pratensis* occurred in soil with heather from Scotland and *Tylenchorhynchus macrurus* in soil about raspberry roots from Germany. Soil on roots of wallflower plants from England contained *Tylenchorhynchus dubius* and *Heterodera cruciferae* cysts. *Meloidogyne hapla* occurred on tree peony roots and *M. incognita* on weigelia from the U.S.A. Numerous *Pratylenchus coffeeae* and a few *T. parvus*, *Helicotylenchus* sp., *Paratylenchus* sp. and *M. arenaria* were associated with chrysanthemums from the U.S.A.

D.J.H.

354—Deutsche Medizinische Wochenschrift.

- a. SCHUBERT, R., 1958.—“Taeniasis.” **83** (30), 1296.
- b. SCHUBERT, R., 1958.—“Ascaridiasis.” **83** (41), 1833–1834.

(354a) Schubert gives a brief account of *Taenia* infection in man, dealing with diagnosis, pathology and treatment. He considers that acridine dyes (Atebrin and Acranil) are the most promising drugs against this infection: the recommended dosage is 0.8 gm. dissolved in a warm fluid and administered by duodenal sound.

A.E.F.

(354b) In the course of this note on *Ascaris* infection in man Schubert points out that the best means of control lie in the observance of the elementary rules of hygiene—human faeces should not be used for manuring vegetable plots and care should be taken not to eat contaminated vegetables. All other aspects of ascariasis are briefly touched on. The piperazine derivatives are the remedies of choice.

A.E.F.

355—Dissertation Abstracts.

- a. WEHUNT, E. J., 1958.—“Nematodes associated with white clover (*Trifolium repens* L.) in Louisiana.” **19** (3), 426–427.
- b. TURNER, H. F., 1958.—“The life history of *Fibricola cratera* (Barker and Noll, 1915) Dubois 1932 (Trematoda: Diplostomidae).” **19** (3), 609.
- c. GIBBS, B. J., 1958.—“A study of *Histomonas meleagridis*, a protozoal parasite transmitted by a nematode.” **19** (4), 914.
- d. CAMPBELL, J. W., 1958.—“The nitrogen and amino acid composition of three species of anoplocephalid cestodes: *Moniezia expansa*, *Thysanosoma actinoides*, and *Cittotaenia perplexa*.” **19** (5), 942–943.
- e. BRIGGS, N. T., 1958.—“Serological responses of cotton rats and white rats in relation to the extent of infection with *Litomosoides carinii* (Travassos, 1919) Chandler, 1931.” **19** (5), 1062.
- f. SAYRE, R. M., 1958.—“Plant tissue culture as a tool in the study of the physiology of the root-knot nematode, *Meloidogyne incognita* Chit.” **19** (6), 1185.
- g. FISHER, P. D., 1958.—“Studies on duration of life of *Aspiculuris tetraptera*, a nematode parasite in mice, with observations on its life cycle.” **19** (6), 1346.
- h. CROSS, Jr., H. J., 1958.—“Natural resistance of the white rat to the mouse parasite *Nematospiroides dubius* Baylis, 1926 (Nematoda: Heligmosomidae).” **19** (6), 1347–1348.
- i. HECK, Jr., O. B., 1958.—“Studies on *Gastrotrema* in waterfowl.” **19** (6), 1481.
- j. LAU, N. E., 1958.—“A study of insects and nematodes and the associated necrosis on the roots of red clover in New Jersey.” **19** (6), 1483.
- k. WOOD, I. B., 1958.—“The experimental transmission of some gastro-intestinal nematodes of cattle and sheep to laboratory rabbits.” **19** (6), 1485–1486.
- l. WORLEY, D. E., 1958.—“Ecological and therapeutic studies on gastrointestinal parasitism in beef cattle in Kansas.” **19** (6), 1486–1487.

(355a) Wehunt found *Meloidogyne* spp. in 14·6% of plant and soil samples from white clover fields in the Red and Mississippi River floodplains of Louisiana, and *Heterodera trifolii* in 7·4%. 15 species of free-living nematodes representing 12 genera [no details are given] were found in associated soil samples. Green-house studies showed that six of these 15 species could parasitize white clover. Field studies indicated that the nematodes caused damage to white clover under field conditions and that they may be a factor in the decline of stands of this crop in Louisiana to the extent of over one million dollars annually.

J.M.W.

(355b) Turner succeeded in demonstrating during the summer months all stages of the life-history of *Fibricola cratera* experimentally in the laboratory. The miracidium has two pairs of flame cells and the epidermal plate formula 6:9:4:3. Two generations of sporocysts develop following penetration of miracidia into the snail *Physa gyrina*. Furcocercous cercariae, having two pairs of anterior penetration glands and the flame cell formula $2(1+1+1)+(1+1+(1))$, emerge in 24 to 31 days and penetrate young tadpoles, especially those of *Rana pipiens*. Metacercariae (diplostomula) develop in the peritoneal coelom of the tadpoles, but in adult frogs are limited to the muscles of the hind legs. They become infective in 30 to 35 days. Garter snakes of the genus *Thamnophis* may serve as transfer or paratenic hosts but are not essential for the completion of the life-cycle. Adult flukes develop in the duodenum of white mice and reach maturity within a week, when eggs begin to be voided in the faeces. Hatching time is variable. Morphological studies showed that the adult of *F. lucida* differs significantly from those of *F. cratera* and *F. texensis*, while the two last-named species can be separated by their cercarial and metacercarial stages.

J.M.W.

(355c) Gibbs found that 3,358 out of 3,700 chickens examined were infected with *Heterakis gallinae*, the average worm burden being 23. Worms negative for *Histomonas meleagridis* were obtained by feeding embryonated eggs to turkey poult and selecting specimens from birds in which blackhead did not develop. Comparison of sections from infected and uninfected worms showed that the protozoan occurred in the pseudocoel, the walls of the

oviduct, and in the eggs of the ovary, oviduct and uterus. It is suggested that *H. meleagridis* may leave the worm during the moult of the second-stage larva, or via the mouth opening.

J.M.W.

(355d) Campbell determined the nitrogen and amino-acid composition of *Moniezia expansa*, *Thysanosoma actinoides* and *Cittotaenia perplexa*. A closer biochemical relationship was found to exist between *C. perplexa* and *T. actinoides* than between either of these species and *M. expansa*. The percentage of solid matter was higher for *T. actinoides* than for the intestinal forms. Protein amino-acids were qualitatively identical for all three species but differences were found in the amino-acids of the non-protein fractions, the most significant of which was the presence of γ -aminobutyric acid in the intestinal forms and its absence from the hepatic form. Sheep bile contained sufficient amino-acids to satisfy the requirements of *T. actinoides*. It is therefore concluded that direct absorption of amino-acids from the host tissues by cestodes does not occur. The non-alpha amino-acids, β -alanine, β -aminoisobutyric acid and γ -aminobutyric acid are reported for the first time in cestodes.

J.M.W.

(355e) Briggs found that the cotton-rat, the normal host, showed little natural resistance to primary infections with *Liromoscidus carinii*, 40% to 50% of infective larvae introduced subcutaneously developing to the adult stage. The white rat, on the other hand, shows strong natural resistance to migrating larvae of this parasite, less than 10% developing further. Both hosts developed strong serological response following multiple infections, the presence of antibodies being detected by the oral precipitate test. Natural resistance in the white rat was markedly depressed by daily injections of cortisone (50 mg. per kg.) beginning six to ten days before infection. Suppression of antibody responses was exhibited by treated animals.

J.M.W.

(355f) Tomato roots, aseptically infected with eggs and larvae of *Meloidogyne incognita* were excised and cultured in White's liquid medium. The nematodes developed to the second larval stage. These free-living larvae did not reinfect roots in the liquid culture but completed their life-cycle when pipetted to fresh seedlings or roots in White's agar. Viable second-stage larvae could be found in excised root cultures for more than four months and were used to study the effect on root penetration of agar hardness and host susceptibility. Potato sprouts and pith from tobacco and potato were also cultured on White's agar supplemented with auxin and kinetin. Of the tissues obtained, the larvae were able to penetrate and develop on excised roots, on callus tissue cultures with roots and on tissues with some degree of vascularization.

G.I.P.

(355g) Fisher studied the duration of life of *Aspiculuris tetraptera* in five to six-week-old white mice. The curves drawn showed that the life table of *Aspiculuris* fell into the intermediate category described for lower forms of life. Observations were made on embryonation, hatching and moulting. Observations showed that an important, intracrypt phase occurred directly after infection.

N.J.

(355h) Cross has infected white rats with *Nematospiroides dubius*. The experiment showed that the worms became enclosed in connective tissue cysts and were unable to re-enter the intestinal lumen and continue their development. Daily doses of 5 gm. of cortisone per 100 gm. body-weight inhibited the cyst formation and the larvae re-entered the intestinal lumen as they did in laboratory mice. Oviposition started one to two days later than in mice. Cortisone injections four days before infection did not affect the additional phases of resistance in rats. These phases consisted of longer prepatent period, smaller percentage of worm development, shorter period of patency and lower rate of egg production than in mice. Cortisone injected into rats four to seven days after infection was less effective than treatment on the day of infection. Administered to mice, cortisone had no influence on the parasite's life-cycle. Rats infected with large doses of larvae and not treated with cortisone acquired a resistance to subsequent infections. A preinfection with small doses of larvae in conjunction with cortisone treatment also induced a resistance to reinfection in rats. The resistance was manifested after the primary infection had died out. This phenomenon was not observed in mice.

N.J.

(355i) Heck examined *Gastrotaenia cygni* and showed that genital pores and ducts were present. Comparison with *Apora dogieli*, also originally described as lacking genital ducts, showed that *Apora* is a synonym of *Gastrotaenia* and that *A. dogieli* is probably identical with *G. cygni*. On the basis of the dimensions of the strobila and the shape and dimensions of the scolex and rostellum this cestode is transferred to the Hymenolepididae. The small number of gravid specimens found indicates either that its location under the lining of the gizzard is not its normal habitat in ducks or that it normally occurs in some other host species. The author finally concludes on morphological grounds that it is a species of *Diorchis*. Genital ducts and pores were also observed to be present in *Nematoparataenia paradoxa*, which is transferred to the Davaineidae, and it is suggested that this species also is a parasite occurring in an abnormal host and that it actually belongs to *Ophryocotyle*. The family Nematoparataeniidae and the order Aporoidea should therefore be abolished. S.W.

(355j) Lau reports that nematodes were largely responsible for failure of red clover crops in New Jersey. N.J.

(355k) Wood, using mixed ovine nematode inocula and pure cultures, successfully infected rabbits with *Trichostrongylus colubriformis*, *T. axei*, *Cooperia curticei*, *C. oncophora*, *C. punctata* and *Ostertagia circumcincta*. *C. curticei* and *C. punctata* showed normal parasite-host relationships. Successive passages of *T. colubriformis* in the rabbit resulted in increased infectivity at each of five successive nematode generations. Suppression of egg production and frequent spontaneous eliminations of worms resulted from infections with 3,500 or more infective *T. colubriformis* larvae. Uniform infections of a duration of over 100 days were obtained with a dose of 1,700 infective larvae. Bio-assays conducted on groups of three rabbits per treatment showed that phenothiazine and Trolene at the respective doses of 2 gm. per kg. and 200 mg. per kg. body-weight were inactive against *T. colubriformis*. Carbon tetrachloride at a dose of 0.2 ml. per kg. was highly active in this parasite-host relation. Efficacy of diethylcarbamazine against *T. colubriformis* in the rabbit was moderate. Male-to-female ratios of *T. colubriformis* were 0.92 in male rabbits and 0.85 in female rabbits. A marked age resistance, manifested by suppressed egg production and worm burdens, was observed in 44-week-old rabbits, as compared with those 10 weeks old. N.J.

(355l) Worley reports that negative correlation was found between the average air temperature and the average egg count of gastro-intestinal parasites in calves. These observations were made in three different calf herds over a period of three years. Periods of optimum temperature for the propagation of nematodes occurred in spring and autumn. However, in April and May there was sufficient rainfall concurrently with optimum temperatures for maximum survival and development of nematode larvae. There was no marked difference in worm burden between calves born in spring and in autumn but in autumn-born calves the infections remained low for six months while in spring-born animals they increased at about four months of age. An experiment with two groups of about 20 calves, conducted during 13 months, showed that calves pastured from June to November had much heavier worm infections than those kept in feed-lots during the same period. Combined treatment with aureomycin and phenothiazine, added to food, given continuously in two feed-lot tests produced a highly significant reduction in eggs per gm. of faeces. It also resulted in superior weight gains and feed efficiency in the case of heifers. The anthelmintic efficacy of Dow ET-57 (Trolene) used on cattle and bison also gave good results. A single dose of 110 mg. of this drug per kg. body-weight had the same efficacy when given in food or as a bolus. No antiparasitic activity was demonstrated by stilboestrol or Dowco 109 which were given orally at a dose of 14 mg. per kg. body-weight over periods of one, six or twelve days. N.J.

356—Fruktodlaren, Stockholm.

a. PÄÄSUKE, M., 1958.—“Jordgubbsnematoden och dess bekämpning.” 29 (2), 45-48.

(356a) Pääsuke reports that *Aphelenchooides fragariae* infection in strawberries is increasing in Sweden and describes the parasite and the symptoms of infection. Hot-water treatment

offers the best means of control. Plants should be immersed for ten minutes in water at 46.2°C. and then immediately dipped in cold water. No nematodes were found in treated plants and fruit yield increased by from 25% to 60%. In order to avoid loss of plants it is important that they be treated and planted out in cold frames on the same day and that they should be kept damp before and after treatment. Small plants are best and should be treated before roots have developed. Some varieties (e.g., North West, Königin Louise and Macheruchs Frühernte, 30% to 50% of which did not survive) are specially susceptible to hot-water treatment. Nematode-free soil should be used: if this is not possible soil should be chemically disinfected. A simple apparatus for use in hot-water treatment is described.

A.E.F.

357—Informatore Fitopatologico. Bologna.

- a. PUCCI, E., 1958.—“Le anguillulosi.” 8, 50–57.

(357a) Pucci gives a general account of plant-parasitic nematodes and measures for their control, followed by more detailed descriptions of *Anguillulina* [*Anguina*] *tritici* and *Ditylenchus dipsaci* with descriptions of the diseases caused by them and their control. M.T.F.

358—Izvestiya na Instituta po Sravnitelna Patologiya na Domashnite Zhivotni. Sofia.

- a. MATOV, K., VASILEV, I., OSIKOVSKI, E. & YANCHEV, Y., 1958.—[The role of micro-onchocercae in the aetiology of periodic ophthalmia in the horse.] 6, 315–326. [In Bulgarian: German & Russian summaries pp. 325–326.]
- b. VASILEV, I., 1958.—[*Echinodollfusia bulgarica* n.sp. from domestic fowl.] 6, 327–338. [In Bulgarian: English & Russian summaries pp. 337–338.]
- c. VASILEV, I., 1958.—[The helminth fauna of the domestic duck in Bulgaria. I. Trematoda.] 6, 339–346. [In Bulgarian: French & Russian summaries pp. 345–346.]
- d. MATOV, K. & VASILEV, I., 1958.—[On the specific independence of *Ascaris ovis* Rudolphi, 1819.] 7, 255–280. [In Bulgarian: German & Russian summaries pp. 277–280.]
- e. MATOV, K. & VASILEV, I., 1958.—[The lamb as a host of *Neascaris vitulorum* (Goeze, 1782) Travassos, 1927.] 7, 281–297. [In Bulgarian: German & Russian summaries pp. 296–297.]

(358a) Matov *et al.* examined 412 horses; 287 of them had clinically healthy eyes, 121 had permanent deformation of one or both eyes and four horses were slaughtered when they had acute ophthalmia. They also examined 41 donkeys. *Onchocerca cervicalis* was found in the cervical ligament of 83.73% of the horses examined and *O. reticulata* in 71.15%. *Setaria equina* and *Parafilaria multipapillosa* also occurred but the incidence and degree of infection with these two were much lower than with the *Onchocerca* spp. Microfilariae of *O. cervicalis* were found in the eyes of 82.23% of horses not suffering from ophthalmia. The degree of infection of the four slaughtered horses with microfilariae was very low. From this and from the fact that *Onchocerca* microfilariae were also found in donkeys, the authors conclude that they are not the principal cause of periodic ophthalmia.

N.J.

(358b) Vasilev describes and illustrates a new species, *Echinodollfusia bulgarica*. Seven specimens of this helminth were found at autopsy of 2,500 chickens. The new species resembles *E. stenor* closely but differs from it in the position of the vitelline glands and the number of oral spines. The vitelline glands occupy the lateral fields from the posterior side of the acetabulum to the posterior end of the body, the distance between them progressively narrowing posteriorly. There are 37 oral spines. Other echinostomatids found were: *Echinostoma miyagawai* in 23 chickens, *E. revolutum* in about the same number, *E. robustum* in one, *E. paraulum* in one, *Echinoparyphium recurvatum* in 11, and *Hypoderæum conoideum* in two.

N.J.

(358c) Vasilev examined 210 domestic ducks, mainly during summer and autumn. The incidence of helminthic infection was as follows: *Tracheophilus sisowi* 2.83%, *Notocotylus attenuatus* 19.52%, *N. aegyptiacus* 0.95%, *Catatropis verrucosa* 0.95%, *Opisthorchis simulans* 0.95%, *Metorchis intermedius* 0.95%, *M. xanthosomus* 0.48%, *Echinoparyphium recurvatum* 8.09%, *Hypoderæum conoideum* 4.28%, *Bilharziella polonica* 9.04%, *Cotylurus cornutus* 5.71%, *Apatemon gracilis* 1.43%. *Echinostoma miyagawai*, *E. paraulum*, *E. revolutum* and *E. robustum* were found in 23.33% of the ducks, almost always in mixed infections.

N.J.

(358d) Matov & Vasilev examined a great quantity of ascarids recovered from lambs and sheep in Sofia abattoir. They conclude that the only difference between *Ascaris ovis* Rudolphi and *A. suum* Goeze was in the size of the body and in the size of separate organs. The eggs of *A. ovis* were found to develop in the same way and at the same time intervals as those of *A. suum* under similar conditions. Infective *A. ovis* larvae migrated in the tissues of white mice, lambs and piglets in the same manner as the larvae of *A. suum*. Piglets were infected *per os* with ascarid larvae developed from eggs obtained from ascarids in lambs and lambs were infected with larvae originating from ascarids in pigs. In both these cases sexually adult worms were recovered from the intestine as a result of the infections. Attempts to infect lambs by the intra-uterine route with *A. suum* and *A. lumbricoides* as well as to infect them directly with the former species were unsuccessful. The authors conclude that *A. ovis* Rudolphi should be considered as a synonym of *A. suum* Goeze. N.J.

(358e) Matov & Vasilev describe and illustrate the anatomy and morphology of *Neoascaris* from lambs. After thorough examination of these ascarids the authors conclude that their characteristics exactly correspond with those of *N. vitulorum* from calves. By infecting laboratory animals it was found that the developmental cycle of *Neoascaris* from lambs was similar to that of *N. vitulorum* from calves. Infective larvae from eggs obtained from lambs were successfully used to infect two calves by the intra-uterine route. An attempt to infect *per os* one pregnant ewe, two calves and two lambs with larvae obtained from the two experimentally infected calves failed. Sexually mature worms were recovered from lambs as a result of infection of two pregnant ewes. In lambs development of *Neoascaris* was found to be retarded and the degree of infection was lower than in calves. The authors conclude that lambs should be also considered as hosts of *N. vitulorum*. N.J.

359—Japanese Journal of Medical Science and Biology.

- a. ISHIZAKI, T., BANDO, T. & KOBAYASHI, Y., 1958.—“The studies on the fluid environment of ascaris. Influence of pH and effect of antibiotics and antimycotics (dehydroacetic acid) in fluid media upon the survival length and the duration of normal locomotion.” **11** (4), 223–233.
- b. KOMIYA, Y., KOJIMA, K. & YASURAOKA, K., 1958.—“Study on the food habit of *Oncomelania*. I. A new simple technic for studying the food habit of *Oncomelania* and its mouth opening reaction.” **11** (5), 329–337.
- c. KOMIYA, Y. & HASHIMOTO, I., 1958.—“The survival of *Oncomelania nosophora*, the vector snail of *Schistosoma japonicum* under the dried condition and their water loss.” **11** (5), 339–346.
- d. KOMIYA, Y. & IIJIMA, T., 1958.—“The local difference of the resistance of *Oncomelania nosophora*, the vector snail of *Schistosoma japonicum*, to the desiccation.” **11** (6), 455–459.

(359a) Ishizaki *et al.* kept pig *Ascaris* at 32°C. in U-shaped glass tubes filled with 200 ml. of modified Locke's solution (sodium chloride 0·95%; potassium chloride 0·04%; calcium chloride 0·024%; sodium bicarbonate 0·015%) which was changed every 48 hours and which had an initial pH of 7·8. The pH fell to 5·5 after 24 hours and subsequently remained constant. Control experiments in which antibiotics and antimycotics were added to the medium showed that the change in pH was chiefly due to the worms themselves and not to the contaminating micro-organisms. Development of turbidity in the medium was shown by similar methods to be due to the metabolites of the worms rather than to the micro-organisms. Survival time was remarkably independent of pH variation between 4·0 and 11·0, especially in physiological saline. Development of micro-organisms in the medium reduced survival time and was counteracted. Maximum survival of experimental worms was 21·4 days as against 11·4 days in the controls and was achieved in the modified Locke's solution, having a pH level between six and ten and to which had been added dihydrostreptomycin at 50 μ per ml. of medium, penicillin at ten units per ml. and dehydroacetic acid at 100 μ per ml. J.M.W.

(359b) Komiya and his collaborators have studied the mouth opening activity of *Oncomelania* snails by placing the snails in moist petri-dishes, waiting until the animals have emerged and started to move around, then inverting the dish in order to observe the proboscis from beneath. They have found that the mouth opening reaction occurs most frequently between the temperatures of 23°C.–25°C., is unaffected by pH in the range 5·0–8·5, is most rapid and

regular during the first ten minutes of feeding after a period of starvation, and is dependent upon the presence of a sufficient film of moisture around the proboscis and tentacles. The reaction occurs whether food is available or not but is more regular and rapid if a film of food such as rice starch is spread on the petri dish.

C.W.

(359c) Komiya & Hashimoto have investigated the rate of water loss and resistance to desiccation of the snail *Oncomelania nosophora*. They have found that water loss is less rapid in adult snails than in young ones and, in consequence, adults are capable of surviving longer periods of desiccation (80–100 days). The resistance to dryness was slightly less in summer than in winter and it is suggested that this may be due to physiological changes associated with hibernation. It appears that male snails are slightly more susceptible to the effects of desiccation than females.

C.W.

(359d) Komiya & Iijima have shown that specimens of *Oncomelania nosophora* from habitats that are wet throughout the year are less well able to withstand experimental desiccation than are individuals from localities which dry out seasonally. 100% mortality was reached in six weeks among snails from a permanently wet habitat while those from a periodically dry place survived for eleven weeks. No conchological differences were detected between the two forms.

C.W.

360—Journal of the American Society of Sugar Beet Technologists.

- a. CAVENESS, F. E., 1958.—“The incidence of *Heterodera schachtii* soil population densities on various soil types.” **10** (2), 177–180.

(360a) Sugar-beet fields infested with beet eelworm were sampled to determine the population densities of larvae in the soil and cysts on the roots. Samples were taken at (i) the centre of an infested area in a field, (ii) midway between the centre and the edge of the infested area, (iii) at the edge and (iv) in a part of the field apparently unaffected by the beet eelworm. On the basis of this data, Caveness concludes that at low population densities the population density gradient increased from the centre of infestation to the unaffected parts of the field. At high population densities the gradient was reversed, the highest population densities occurring in the centre of the infested area. Numbers of total soil nematodes suggest that their population densities are influenced by the presence of plant-parasitic eelworms.

H.R.W.

361—Journal of the Formosan Medical Association.

- a. HSÜ, M. C. ET AL., 1958.—[Observations on hookworm disease among coal miners in Taiwan. I. A survey on the incidence of hookworm infection in the workers of coal mines.] **57** (1), 7–23. [In Chinese: English summary pp. 22–23.]
 b. HUANG, W. H. & CHIU, J. K., 1958.—[The incidence of *Paragonimus metacercaria* infection in *Eriocheir japonicus* being marketed in Taipei, Taiwan.] **57** (3), 158–168. [In Chinese: English summary pp. 167–168.]

(361a) The authors examined, by direct smear and salt flotation, a single faecal specimen from 4,184 persons associated with or working in coal mines in Formosa. The observed incidence of hookworm was: in miners 3,075 positive of 3,630 examined, in miners' families 66 positive of 115 examined, in office workers 156 positive of 305 examined and in office workers' families 44 positive of 134 examined. The differences in the infection rate in different mines and between different groups of workers are discussed. Infective hookworm larvae were present in the soil in the pits and of the workers' vegetable gardens.

S.W.

(361b) The authors describe Taipei as a new endemic focus of paragonimiasis. This is caused by the migration in 1949 of a large number of Chinese from the mainland, and the natives of Chekiang and Kiangsu [endemic foci on the mainland] continued their habit of eating “drunken crabs”. The living crabs are immersed in a rice wine with some table salt or soy sauce and a spice. The crabs are usually eaten the following day. Around Taipei the authors examined 1,152 river crabs, *Eriocheir japonicus*, collected in nine localities around the city. 191 crabs or 16·6% carried *Paragonimus metacercariae*, with a total of 607 metacercariae collected. Male

and female crabs were equally infected. Crabs caught in the rapid running, shallow, clear mountain stream showed a higher incidence of metacercariae than those in the deep, slowly flowing river in the plain. The highest incidence of metacercariae was in the gills with 86·9%, next were the leg muscles with 27·2%, third were the thoracic muscles with 23·6% and fourth the liver with 7·9%. Of the 607 *Paragonimus* metacercariae, 410 (67·5%) were found in the gills, 97 (16·0%) in the leg muscles, 69 (11·4%) in the thoracic muscles, and 31 (5·1%) in the liver. All the metacercariae were identified as *Paragonimus westermani*.
L.S.Y.

362—Journal of Infectious Diseases.

- a. WEBER, T. B. & RUBIN, R., 1958.—“The eosinophilic response to infection with the cattle lungworm, *Dictyocaulus viviparus*.” **102** (3), 214-218.

(362a) The authors have investigated the relationship between eosinophilia and single and repeated exposures to infection with *Dictyocaulus viviparus* in cattle. Animals showed the highest eosinophil count two weeks after exposure followed by two further peaks and thereafter the count returned to normal. In those animals which had repeated re-exposures at three-monthly intervals, the second exposure gave the greatest response. A decline in response occurred with each succeeding reinfection. A group of cattle was given immune serum as well as the infective larvae and in these animals an initial peak was obtained after which no further rises were seen and the eosinophil count returned to normal.
K.H.

363—Journal of the Rio Grande Valley Horticultural Society.

- a. SLEETH, B., 1958.—“Soil fumigation increases growth of citrus replants.” **12**, 53-56.
- b. MACHMER, J. H., 1958.—“Effect of soil salinity on nematodes in citrus and papaya plantings.” **12**, 57-60.

(363a) Sleeth found that soil fumigation with D-D at 800 lb. per acre was more effective than leaching and the addition of minor elements, for increasing growth of sour orange seedlings. A field test using EDB at 350 lb. per acre gave similar improvement in citrus tree growth. It is suggested that parasitic citrus nematodes may be the primary cause of slower growth in citrus replants. Soil fumigation, however, may have other beneficial effects apart from being nematicidal.
J.E.P.

(363b) Populations of soil nematodes, including the citrus nematode, *Tylenchulus semi-penetrans*, and the root-knot nematode, *Meloidogyne incognita* var. *acrita*, increased to a higher level in host plant roots under constantly high salinity, than in roots growing in soil with lower salinity levels. Machmer suggests that the nematodes may be more tolerant of high salinity in soils than plants.
H.R.W.

364—Krolikovodstvo i Zverovodstvo.

- a. MITROKHIN, V. U., 1958.—[The survival of *Opisthorchis* metacercariae in fish frozen in blocks of ice.] **1** (1), 32-34. [In Russian.]

(364a) Mitrokhin investigated the survival of metacercariae of *Opisthorchis felineus* in fish (*Idus idris*) frozen in blocks of ice. He found that if 5·0 kg. of fish were placed in containers which were kept outside at temperatures which ranged from -1°C. to -31°C. the fish could safely be fed to silver foxes after 13 days. If the blocks of ice were kept in a room with a temperature between -5°C. and -8°C. the fish was safe for feeding 16 days later. Gastric juice and heat can be used for determining the viability of metacercariae, but feeding to experimental animals is more satisfactory.
C.R.

365—Medical Journal of Malaya.

- a. TASKER, P. W. G., 1958.—“Studies of the nutritional anaemias of Malaya. The influence of hookworm infection.” **13** (2), 159–164.

(365a) Tasker estimated the haemoglobin level and the hookworm load in over 1,400 patients attending the General Hospital at Kuala Lumpur and related the two sets of data in an attempt to assess the importance of hookworm infection in causing the iron deficiency anaemia so prevalent in Malaya. He concludes that the degree of anaemia and the hookworm rates are closely correlated, especially in Chinese patients and that, in this population, the hookworm is partially responsible for this anaemia. A study of the serum proteins in 162 patients with a very low haemoglobin level gave no evidence that malnutrition has an effect on the hookworm infection rates.

J.M.W.

366—Monatshefte für Veterinärmedizin.

- a. KUMM, H., 1958.—“Zusammenfassung der Tierschadenstatistik für die Deutsche Demokratische Republik 1954–1956.” **13** (17), 529–530.

(366a) This survey of disease in domestic animals in Eastern Germany during the years 1954 to 1956 is based on the statistics of an insurance company. Of helminthological interest are the statements that 7·8% of cattle disease is due to “parasitic diseases (liver-fluke and worm infection)” and that in sheep parasitic diseases, (“worm infection, lungworm disease, stomach worm disease and liver-fluke”) are responsible for 49·8% of disease and are increasing from year to year.

A.E.F.

367—Nachrichtenblatt für den Deutschen Pflanzenschutzdienst. Berlin.

- a. DIETER, A., 1958.—“Beobachtungen über *Heterodera major* O. Schm. an Hafer. I. Mitteilung.” **12** (8), 155–158.

(367a) Dieter tested 17 oat varieties for resistance to *Heterodera major*; there were differences in the average number of cysts per plant. No variety was completely resistant but the varieties Heines Silber, Asta and Picton produced few cysts. Contrary to the findings of Goffart the climatic conditions had no marked effect on cyst formation. Late sown oats produced almost as many cysts as early sown, though the percentage of white cysts was much higher on the former. There was a correlation between the eelworm infestation and the difference between the oat yields of 1957 and 1952–56; heavily infested varieties showing a decrease in yield. J.J.H.

368—Nordisk Hygienisk Tidskrift.

- a. SARAJAS, H. S. S. & PÄTIÄLÄ, R., 1958.—“Köldverkan på utvecklingskapaciteten hos binnikemaskens (*Diphyllobothrium latum*) ova.” **39** (3/4), 49–52. [English summary pp. 51–52.]

(368a) Sarajas & Pätiälä have carried out a series of tests in order to determine the resistance of *Diphyllobothrium latum* ova to environmental temperature. Ova in human faeces kept at temperatures above 1°C. remained viable but when ova were exposed to temperatures below freezing point for periods up to seven days they were no longer viable. This suggests that human and animal faeces containing *Diphyllobothrium* ova, provided they have been exposed to sub-zero temperatures, could not infect water-courses during winter.

A.E.F.

369—Nordisk Medicin.

- a. DUNGAL, N., 1958.—“Ekinokoksygdommens udryddelse i Island.” **59** (13), 458–461. [English summary p. 461.]
 b. GABINUS, O., STIGMÄRKER, E. & JONASSON, G., 1958.—“Tropiska sjukdomar, särskilt filarioser, i Sverige.” **59** (13), 461–466. [English summary p. 466.]
 c. GERNER-SMIDT, M., 1958.—“Schistosomiasis. Oversigt og et nyt dansk tilfaelde.” **60** (48), 1720–1722. [English summary p. 1722.]
 d. SANDBERG, E., 1958.—“Cysticercosis cerebri. Et tilfaelde verificeret ved operation.” **60** (50), 1788–1789. [English summary p. 1789.]

(369a) [This paper covers the same ground as Dungal (1957), for abstract see Helm. Abs., **26**, No. 429b.]

(369b) Gabinus *et al.* report on the examination, at the Hospital for Infectious Diseases, Jönköping, Sweden, of 156 persons who had returned from the tropics. Helminth infections were found as follows: *Acanthocheilonema perstans*, 20; *Loa loa*, 19; *Wuchereria bancrofti*, one; *Onchocerca volvulus*, one; *Trichuris trichiura*, 11; *Ascaris lumbricoides*, two; *Ancylostoma duodenale*, one; *Taenia saginata*, one. The authors are mainly concerned with the filarial infections and give a general account of these, with special reference to diagnosis and treatment. Hetrazan was found to be effective against *Loa*, *Onchocerca* and *W. bancrofti*. Although in the case of *A. perstans* it reduced the microfilarial count there was more resistance than with the other filariae.

A.E.F.

(369c) Gerner-Smidt gives an account of the aetiology, symptomatology, diagnosis and treatment of schistosomiasis. A case of vesical schistosomiasis is reported and it is pointed out that in future more cases may be seen in Scandinavia owing to the stationing of troops in Ghaza and increasing contact between different parts of the world.

W.A.F.W.

(369d) This is the first case to be reported in Scandinavian literature of the surgical removal of cysticerci from a patient with cerebral *Cysticercus cellulosae*.

W.A.F.W.

370—Novedades Científicas. Contribuciones Ocasionales del Museo de Historia Natural La Salle, Caracas. Serie Zoológica.

- LÓPEZ-NEYRA, C. R. & DÍAZ-UNGRÍA, C., 1958.—“Cestodes de Venezuela. V. Cestodes de vertebrados venezolanos. (Segunda nota.)” No. 23, 41 pp. [English summary p. 41.]
- DÍAZ-UNGRÍA, C. & GRACIA RODRIGO, A., 1958.—“Un cambio de nombre por preocupación.” No. 23, p. 42.

(370a) This is a continuation of the fifth of a series of papers on cestodes from Venezuela. López-Neyra & Díaz-Ungría now record eleven species of larvae and adults from fish and wild animals. *Ophiotaenia crotali* n.sp., from *Crotalus durissus terrificus*, resembles *O. paraguayensis* but has 308 to 412 testes per segment. The ten known species of *Ophiotaenia* are listed with their hosts and geographical locations and a table is given of some of their measurements and specific characters. *Rhinebothrium scorzai* n.sp. from the ray *Potamotrygon hystrix* differs from *R. palombi* in that the loculi of the scolex are arranged in two rows in the new species. The authors give a comparative table of the ten known species of *Rhinebothrium*. *Eutetrarhynchus baeri* n.sp. from *P. hystrix* is intermediate between *E. leucomelanus* and *E. ruficollis*, and it is compared in a table with the other four species of *Eutetrarhynchus*. *Oochoristica celebesensis* var. *venezolanensis* n.var. from *Cnemidophorus l. lemniscatus* has 35 to 43 testes per segment. The number and measurements of the rostellar hooks of those species of *Taenia* which have a double crown on the rostellum and larger hooks measuring 300 μ or more are set out in tabular form.

M.MCK.

(370b) As the name *Deltania*, given to a new genus of acanthocephalan by Díaz-Ungría & Gracia in 1957, has already been used by Eisen in 1893 for an oligochaete, the authors now rename their acanthocephalan genus *Deltacanthus*.

M.MCK.

371—Plant Pathology. London.

- LESTER, E. & LARGE, E. C., 1958.—“Surveys of clover rot with incidental observations on eelworm in clover: England and Wales, 1953–55.” 7 (4), 115–124.

(371a) During the clover rot survey of England and Wales in each of the years 1953–55 with incidental observations on stem eelworm on red clover, the presence of eelworm was recorded in 20% of the fields. Moderate to severe crop losses due to stem eelworm attack were found in about 7% of the fields each year.

D.J.H.

372—Presse Médicale.

- a. GALLIARD, H., 1958.—“A propos de l'étiologie filarienne de l'éléphantiasis. ‘La jambe de Cochinchine’ au Travancore (Inde).” **66** (33), 755–757.

(372a) Galliard discusses the aetiology of elephantiasis and other clinical syndromes in relation to filarial infection, and states that the problem must be studied by means of statistics. Although the aetiology in individual cases may be disputed, a study of the epidemiology of filariasis shows a clear relation between the incidence of microfilaraemia and of disease. In Travancore there is a patchy distribution of disease which depends on geological and economic factors. Where the soil is sandy it is necessary to maintain ponds for irrigation and for macerating coco-nut fibre, and in such areas mosquitoes breed prolifically, there are high microfilaria rates, and high disease rates. Where (i) the soil contains salt, (ii) there is a clay soil which retains water during the dry season, (iii) the sea or salt-water lagoons can be used for macerating the coco-nut fibre or (iv) periodic floods wash out the fresh-water lakes, the mosquito density, microfilaria rates and disease rates are low. The clinical diseases associated with *Wuchereria malayi* and *W. bancrofti* are different. In *W. malayi* areas (China, Tonkin, Malaya, Thailand, Indonesia, Siam, India, East Indies and rural parts of Travancore) lymphatic oedema and elephantiasis of the legs below the knee predominate, whereas in *W. bancrofti* areas (New Guinea, North Australia and urban parts of Travancore) urogenital disease predominates or, if the limbs are affected, the whole of the legs and also the arms may be involved. Prophylaxis for five years in Tahiti resulted in a reduction in the numbers of microfilariae in the population and a reduction in disease rates.

W.A.F.W.

373—Proceedings of the American Society for Horticultural Science.

- a. FORD, H. W. & FEDER, W. A., 1958.—“Procedures used for rapid evaluation of citrus for resistance to certain endoparasitic nematodes.” **71**, 278–284.

(373a) Seedlings of citrus varieties and closely related plants were grown in tanks of infested soil containing a high population of *Rudolphus similis* (Cobb) Thorne, built up on okra and other susceptible annuals. After three weeks, the roots were examined for lesions and the number of nematodes present in them determined by an incubation technique. Internal lesions were detected by staining with chromium trioxide. Seedlings of varieties which showed promise under this method were then grown in Petri dishes containing sterile soil and the roots inoculated with known numbers of burrowing nematodes. After five days, the invasion rate, degree of development and the root damage were assessed by a modification of an aceto-osmium staining method. After 35 days, the number of nematodes in the roots was counted by dissecting them out.

A.M.S.

374—Revista de Medicina del Estudio General de Navarra.

- a. GONZÁLEZ-CASTRO, J., MARTOS-GUTIÉRREZ, M. L. & GIRAUN, A., 1958.—“Estudio comparativo de los métodos de Watson y de Otto, Hewitt y Strahan, en cuanto a su eficiencia para concentrar huevos de *Ascaris lumbricoides* y *Trichuris trichiura*.” **2** (2), 71–81. [English summary p. 81.]

(374a) Using the direct smear method as a standard, González-Castro *et al.* have compared the efficacy of Watson's technique for the concentration of *Trichuris* and *Ascaris* ova in human faeces with that of Otto, Hewitt & Strahan. Both these techniques were superior to the direct smear in detecting these infections and Watson's gave a slightly higher percentage of positives than did that of Otto *et al.*

S.W.

375—Revista de Medicina Experimental. Lima.

- a. GONZALES-MUGABURU, L., 1958.—“Hallazgo de *Mansonella ozzardi* en la selva peruana. Nota preliminar.” **12** (1/2), 87–89. [English summary p. 89.]

(375a) Gonzales-Mugaburu reports human infection with *Mansonella ozzardi* for the first time from Peru. Four individuals in the jungle city of Iquitos showed microfilariae in the

circulating blood. Three were in apparently good health but the fourth—a woman 70 years old—was taken into hospital and died a month later. Autopsy revealed numerous microfilariae in the pericardial fluid and one adult female worm in the mesentery.

J.M.W.

376—Scientific American.

- a. HAWKING, F., 1958.—“Filariasis.” **199** (1), 94-101.

377—South African Medical Journal.

- a. FREEDMAN, L. & ELSDON-DEW, R., 1958.—“A note on the incidence of Bilharzia in Durban Bantu school children.” **32** (12), 311.
- b. RABINOWITZ, D., 1958.—“The Katayama syndrome, the early allergic stage of bilharziasis.” **32** (26), 658-660.
- c. JAMES, T., 1958.—“The single-dose treatment of oxyuriasis with promethazine hydrochloride: a cautionary tale.” **32** (27), 689-690.

(377a) In a Bantu school in Durban the incidence of *Schistosoma haematobium*, as shown by a single urine specimen, was 46.8% in 517 boys and 20.2% in 356 girls. The incidence in older boys was more than double that in those up to nine years old but there was no obvious increase in incidence with age amongst the girls.

S.W.

(377b) Rabinowitz gives a short historical account of the Katayama syndrome and a case report of one patient in Johannesburg. Eosinophilia and a positive schistosomal complement fixation test appeared almost simultaneously about six weeks after exposure. There was marked derangement of liver function tests. Miracil-D, in a total dose of 75 mg. per kg. body-weight, gave complete remission of symptoms and there has been no recurrence of pyrexia or ill health. The author is of the opinion that immediate treatment is to be preferred to waiting until ova are demonstrable and that side effects should not allow cessation of treatment.

S.W.

(377c) Two children aged four and six years and their father aged 35 years were given 125 mg. of promethazine hydrochloride for the treatment of threadworm infection. The drug was given in the early evening and some hours later all patients developed severe cortical disorientation accompanied by violent hallucination. The children required sedative treatment and all three fell into deep sleep after several hours of psychical disturbance. This possible distressing reaction to large single doses of promethazine given for the treatment of threadworm infection is considered a serious contra-indication to its use for this purpose.

O.D.S.

378—Station Bulletin, Oregon Agricultural Experiment Station.

- a. JENSEN, H. J., HOWELL, H. B. & COURTNEY, W. D., 1958.—“Grass seed nematode and production of bentgrass seed.” No. 565, 8 pp.

(378a) Jensen *et al.* give a popular account of the “grass seed nematode” [?*Anguina agrostis*] and its effect on bentgrass seed production in parts of Washington and Oregon. Symptoms of an attack by this nematode and its life-history are described and its host range and distribution are given. Infection is often spread to new areas by contaminated seed, movement of crop refuse and harvesting machinery. Control can be effected in some areas by crop rotation and fallow treatment. In other areas prevention of seed formation by clipping, grazing and the destruction of bentgrass in uncultivated areas is the best control method so far. Control by nematicides, searing the turf and stubble burning have not been very successful.

D.J.H.

379—Tidsskrift for Frøavl.

- a. FRANDSEN, K. J., 1958.—“Om rødkløverstammernes resistens mod kløveral og baegersvamp.” **23** (550), 390-396.

(379a) Results from breeding work with red clover carried out at Øtoftegaard, Denmark, are described. By using only plants selected after laboratory infection with stem nematodes for developing new varieties improved resistance has been obtained. In field trials on infested land these new resistant varieties have given much higher yield than older, less resistant varieties.

S.B.

380—Tidsskrift for Planteavl.

- a. LINDHARDT, K. & THUESEN, A., 1958.—“Fortsatte undersøgelser over varmtvandsbehandling mod jordbaeral (*Aphelenchooides* spp.).” **62**, 483-498. [English summary pp. 497-498.]

(380a) Investigations on methods for hot-water treatment of strawberries have been continued and have shown that different varieties may not stand the treatment equally well. Hot-water treatment of dormant strawberry plants in the winter was successful. Treatment of plants in autumn or during rainy periods should be avoided. Treated strawberry plants were reinfected with *Aphelenchooides fragariae* under such circumstances that it seems probable that this nematode species has been able to live in the soil without proper host plants. However, this risk of reinestation seems to be very small. S.B.

381—Tijdschrift voor Diergeneeskunde.

- a. WIBAUT-ISEBREE MOENS, N. L., 1958.—“Distomatosis bij de mens.” **83** (18), 877-884. [English, French & German summaries pp. 882-884.]

(381a) Human infection with *Fasciola hepatica* has been regarded as being exceptional in France and confined to sheep-rearing regions. The map of its distribution published by Deschiens (see *Ann. Inst. Pasteur*, 1958, **94**, pp. 256-271) is reprinted in this paper and shows that the infection occurs in Lorraine, Franche-Comté, Normandy, Brittany, Mayenne, and central and southern France. But in 1956-57, in the Lyon region of south-eastern France, an outbreak of the disease occurred in a cattle-rearing area in which 500 human cases were diagnosed and other unrecognized cases also occurred. Most of the cattle were infected and man acquired the infection from contaminated watercress. *Lymnaea truncatula* and *L. stagnalis*, both of which may be vectors, were found in the waters in which the cress was growing. Early symptoms of the disease resembled those of influenza and paratyphoid. Eosinophilia and a positive intradermal test done with lyophilized antigen were found to be reliable indications of infection. The eggs of *F. hepatica* do not appear in human faeces or bile until three months after infection and are found only with difficulty. In this outbreak they were found in only half of the cases. Treatment with emetine was effective only in cases diagnosed early and two injections were usually needed. Control of the infection in the cattle and of the snail vectors is discussed. Although cattle and sheep are infected in the Netherlands, the risk of infection of man is less because the people there do not eat cress. G.L.

382—Trudi Moskovskoi Veterinarnoi Akademii.

- a. ABULADZE, K. I., 1958.—[Taeniids of birds.] **27**, 14-69. [In Russian.]
- b. VERSHININ, I. I., 1958.—[Pathological changes in the liver of sheep infested with *Dicrocoelium* in relation to the intensity of infection.] **27**, 70-84. [In Russian.]
- c. GILDENBLAT, A. A., 1958.—[Testing of phenothiazine against *Ganguleterakis* in geese.] **27**, 85-90. [In Russian.]
- d. GILDENBLAT, A. A., POTEMLKIN, V. I. & PAVLOVA, N. V., 1958.—[Testing of chlorophosph as an anthelmintic.] **27**, 91-95. [In Russian.]
- e. GORSHKOV, I. P., 1958.—[Epidemiology of *Habronema* and *Draschia* infections of horses.] **27**, 96-111. [In Russian.]
- f. GRIGOREV, N. K., 1958.—[Preservation of sections of trichinous meat.] **27**, 112-116. [In Russian.]
- g. ZASKIND, L. N., 1958.—[Study of the helminth fauna of domestic geese.] **27**, 132-138. [In Russian.]
- h. ZOTOV, V. A., 1958.—[Correct timing for the anthelmintic treatment of fascioliasis in farm animals.] **27**, 139-145. [In Russian.]
- i. KROTOV, A. I., 1958.—[Theoretical considerations in experimental treatment of helminthiases.] **27**, 146-158. [In Russian.]
- j. MITROKHIN, V. U., 1958.—[Survival of metacercariae of *Opisthorchis felineus* in fish frozen under natural conditions.] **27**, 165-171. [In Russian.]
- k. MOSKVIN, S. N., 1958.—[Helminth fauna of domestic animals in Albania.] **27**, 172-189. [In Russian.]
- l. NIKULIN, T. G., 1958.—[Biothermic treatment of pig manure mixed with sawdust for the destruction of helminth eggs.] **27**, 190-195. [In Russian.]
- m. OSIPOV, A. N., 1958.—[The development of eggs of *Heterakis* under natural conditions.] **27**, 196-218. [In Russian.]

- n. PATUNE, Y. Y., 1958.—[Treatment of echinococcosis in dogs using a combination of arecoline and an ether extract of male fern.] **27**, 219-229. [In Russian.]
- o. SHEVTSOV, A. A., 1958.—[Helminth fauna of domestic ducks in the Moscow region.] **27**, 246-252. [In Russian.]

(382a) Abuladze, revising the Taeniidae of birds, considers 16 species to be established and gives their descriptions. These are *Taenia heteracantha*, *T. diaphana*, *T. diaphoracantha*, *T. schavarschi*, *T. asiota*—this species, differing from the other taeniids by the small number of testes (25 to 32), the small hooks (0.045-0.055 mm.) and other characters, may belong to *Cladotaenia*—*Paracladotaenia accipitris*, *Cladotaenia globifera* (type) *C. secunda*, *C. fania*, *C. feuta*, *C. circi*, *C. vulturi*, *C. freami*, *C. oklahomensis*, *C. foxi* and *C. banghami*. *C. mirsoevi* and *C. melierax* are excluded from *Cladotaenia*, one on the absence of any description, the other on the presence of a paruterine organ. Abuladze further lists four unnamed species of *Cladotaenia*, one by Penner (1938), two by Scott (1930) and one by Erickson (1938). He describes the development and the distribution in the U.S.S.R. of cladotaeniids. G.I.P.

(382b) In the Kaluga region, 48.9% to 58% of sheep were infected with *Dicrocoelium*. The infection intensity rose with the age of the animals. The pathological changes found in the liver and bile-ducts basically agreed with those described by other authors. Moreover, Vershinin observed encrustation with calcium salts of necrosed portions of the interlobular connective tissue and intima of the blood vessels and granular dystrophy of the parenchyma, with simultaneous proliferation of liver cells and occasional thrombosis of blood vessels. G.I.P.

(382c) A series of experiments on geese naturally infected with *Ganguleterakis dispar* showed that phenothiazine in single doses of 0.5-1.0 gm. per kg. body-weight cured on an average 80.7% of birds treated. The drug was mixed with moist food and was given after a 12 to 16 hour hunger diet. These doses were without side effects and can be used for free feeding in mass treatment. 1.5 gm. per kg. caused increased peristalsis and frequent defaecations. G.I.P.

(382d) Chlorophos was injected subcutaneously in doses of 15-25 mg. per kg. body-weight as a 10-15% aqueous solution to calves in the neck area and to sheep and rabbits in the thigh. To dogs it was given orally in doses of 40-100 mg. per kg. The treatment proved ineffective against *Fasciola* and *Trichostrongylus* in sheep and cattle and against *Dictyocaulus* in sheep. Chlorophos was effective against *Toxocara* and *Toxascaris* in dogs and *Passalurus ambiguus* in rabbits but requires further testing. G.I.P.

(382e) Three species of *Habronema* and *Draschia* [= *Habronema*] occur in horses in the U.S.S.R. In the central European part, *H. megastoma* is the commonest with a rate of infection of 12% to 57.1%, *H. muscae* is rarer. South-eastern areas are more heavily infected: *H. muscae* is found in 22% to 100% and *H. megastoma* in 13% to 75.8% of horses; *H. microstoma* is infrequent. In the central part of the U.S.S.R. infection takes place during August and September and in central Asia in July. The rate and intensities of infection depend on climatic conditions, management of the animals and treatment of manure. G.I.P.

(382f) Meat sections, 0.5 cm. thick and showing *Trichinella*, were compressed for one day. They were then placed on slides, well soaked in one drop each of lactic acid (undiluted), glycerin (undiluted) and formalin (40%), covered by a slip and sealed. Alternatively, the sections were presoaked for two hours at room temperature in the three solutions consecutively and then placed in a mixture of all three and sealed. Such sections, when kept for four years, remained unchanged even when repeatedly subjected to several months of 30-40°C. and below 0°C. The spirally coiled larvae and their capsules were clearly seen. G.I.P.

(382g) Zaskind has examined 400 domestic geese and lists 12 helminth species for the Moscow region. *Apatemon gracilis*, which is new for the region and is recorded for the second time for the U.S.S.R., is described from the author's material. The second species described is *Psilotrema simillimum*, eight specimens of which were found in a goose from the Yakutsk republic. G.I.P.

(382h) In the Moscow region, fascioliasis of calves and adult cattle put out to pasture is first noticed in September and is highest in January to February. Planned treatment of ruminants should therefore be done twice yearly: once in February and again in November immediately after housing the animals. G.I.P.

(382i) Krotov classifies anthelmintics according to the character of their action on the parasite into: (i) protoplasmic poisons, e.g. carbon tetrachloride, hexylresorcinol, chenopodium oil; (ii) compounds stimulating the nervous system and causing convulsive contraction of the worms, e.g. santonin, piperazine; (iii) compounds paralysing the musculature of flatworms, e.g. extracts of male fern and *Punica granatum* bark; (iv) compounds affecting enzymatic activity by, e.g. oxygen, sodium fluoride; (v) proteolytic enzymes. These groups are further subdivided into two to four types. Krotov discusses the mechanism of their action and outlines the directions which tests for new anthelmintics can take—empirical or based on the physiology of the worms. G.I.P.

(382j) In fish naturally frozen during the autumn in the Khanty-Mansiysk area, metacercariae of *Opisthorchis felineus* survived not more than (i) 24 days when the fish were kept in stacks (temperatures of -3°C . to -12°C .), (ii) 11 days when the fish were crated (temperatures of -1°C . to -25°C .) and (iii) 22 days when the fish were piled in storehouses (temperatures of -3°C . to -12°C .). In this area the fish are used raw for feeding foxes. G.I.P.

(382k) From a two-year survey of the helminth fauna of domesticated animals in Albania, Moskin lists three species of trematodes, ten species of cestodes, 37 species of nematodes and one species of acanthocephalan. He states which of the infections are frequent and pathogenic to the various types of animals. G.I.P.

(382l) It was shown experimentally that samples of ascarid eggs placed at various depths in heaps of pig manure and sawdust (2:1 proportion) were killed by the temperatures reached. The outside 15 cm. remain unaffected and should not be subsequently utilized. In heaps measuring 1.25 m. in height, 2 m. in length and 1.25-1.55 m. in width, the maximum temperature reached was 53.8°C . (at 60 cm. depth) after 20 days in the spring (air temperature from -7°C . to $+9.9^{\circ}\text{C}$. and 65°C . after 17 days or less in the summer (air temperatures 16°C . to 25°C .). G.I.P.

(382m) The development of *Heterakis* eggs in chicken faeces placed on or in the ground was examined in the conditions of central U.S.S.R. in 1956. In May (average temperature 10.7°C . and relative humidity 70%) only some of the eggs reached infectivity after 39 to 44 days. In June (average temperature 21.2°C ., relative humidity 60%) a proportion of the eggs became infective after 16 to 24 days. In July (average temperature 15.6°C ., relative humidity 70%) and in August (average temperature 14.8°C ., relative humidity 81%) the eggs became infective in 20 to 26 days and in 23 to 30 days respectively. No development occurred in April (average temperature 4°C . or September (average temperature 8.5°C .). G.I.P.

(382n) Sixteen dogs experimentally infected with *Echinococcus* scoleces were treated by Nosik's method (published in a doctoral dissertation in 1953). 2-3 mg. per kg. body-weight of arecoline hydrobromide of natural origin was administered in a little meat or milk after a one-day hunger-diet and was followed by 0.2-0.3 gm. per kg. of the ether extract of male fern (in gelatin capsules). 2 to 5 drops of iodine (in water) were given before both compounds and the treatment was repeated after ten days. In ten dogs treated against immature worms (27 to 50 days after infection) the intens-efficacy was 93.59% and 25% were cured, while for six dogs treated against mature worms (16 weeks after infection) these values were 98.1% and 50%, respectively. Synthetic arecoline hydrobromide was slightly less effective; in an increased dose of 5 mg. per kg. (in 0.5% solution) it cured all dogs treated, but caused frequent vomiting. Following such vomiting the dogs were given a supplementary amount of one-third to one-half of the original dose. G.I.P.

(382 o) In the Moscow region, 96% of 868 domestic ducks examined were infected with 21 species of trematodes, nematodes and cestodes. The most widely distributed were *Notocotylus attenuatus* (56%), *Trichostrongylus tenius* (45%), *Echinostoma miyagawai* (40%), *Dicranotaenia collaris* (38%), *Tetramerites fissispina* (35%) and *Thomoxen anatis* (35%). G.I.P.

383—Uchenie Zapiski Vitebskogo Veterinarnogo Instituta.

- a. NIKULIN, T. G., SHEPELEV, D. S. & VINCHEK, A. N., 1958.—[An outbreak of *Echinococcus* infection in pigs in the Vitebsk area.] **16** (1), 48–51. [In Russian.]
- b. SHEPELEV, D. S., 1958.—[Experimental infection of piglets with *Taenia hydatigena* eggs.] **16** (1), 52–55. [In Russian.]
- c. SHEPELEV, D. S., 1958.—[The distribution of *Taenia hydatigena* in dogs and wild carnivores.] **16** (1), 56–59. [In Russian.]
- d. ZEKHNOV, M. I., 1958.—[The parasite fauna of *Lampræta*. (Note II).] **16** (1), 137–141. [In Russian.]
- e. KALETSKAYA, S. L., 1958.—[Parasites of fish in Lake Bolshoi Ivan (Pskov region).] **16** (1), 142–154. [In Russian.]

(383a) The authors report on an outbreak of echinococcosis among pigs on a Vitebsk farm during 1957–58. Eight out of 12 pigs examined by an allergic test were infected. Up to 2,219 cysts were counted in the enlarged liver of one of three slaughtered sows. Of these, 1,249 were multilocular and 370 unilocular. 45% of the cysts were sterile. Stray dogs which were allowed access to the pig sties are believed to be responsible for spreading the infection.

G.I.P.

(383b) The symptoms, morphological changes and blood picture associated with acute, subacute and chronic cysticerciasis were studied on eight piglets experimentally infected with 1,400 to 20,000 eggs of *Taenia hydatigena* per kg. body-weight. G.I.P.

(383c) In the Ivanovo region various carnivores were examined as carriers of *Taenia hydatigena* infection to farm animals. This species was found in 16·3% of 128 stray dogs, in 4·1% of 791 watch and working dogs and in 69·2% of 13 wolves. 24 foxes, 4 raccoon-like dogs [*Nyctereutes procyonoides*], one bear and one marten were not infected. Other helminths present in the dogs were *Dipylidium caninum*, *T. pisiformis*, *Uncinaria stenocephala*, *Toxascaris leonina* and *Toxocara canis* (only in the working dogs), and in the wolves and foxes *Alaria* sp. and *Trichinella spiralis*. G.I.P.

(383d) The first of these papers on the parasites of *Lampræta* was published in 1956 in volume 14 of the same journal. In this second paper Zekhnov lists with short notes on measurements and morphology, the following larval trematodes from *L. planeri* and *L. mariae* in the West Dvina and Upper Dnieper rivers: *Metorchis* sp., *Apophallus* sp., *Paratormops siluri*, *Diplostomum spathaceum*, *D. petromyzontis fluviatilis*, *Neodiplostomulum hughesi*, *Tetracotyle* sp. I, II, III and IV and a number of a generically and specifically unidentified metacercaria of Acanthocolpidae. He recalls some earlier work by other authors on the parasites of lampreys and concludes that the brook and river lampreys through their mode of feeding, have lost a trophic connection with invertebrate intermediate hosts and are therefore infected with species not requiring such intermediaries. G.I.P.

(383e) The 64 parasites found on examination of a number of economically important fish (41 *Abramis brama*, 30 *Rutilus rutilus*, 15 *Alburnus alburnus*, 9 *Coregonus albula*, 34 *Perca fluviatilis*, 19 *Esox lucius*, 15 *Lucioperca lucioperca*, a few *Acerina cernua*, *Scardinius erythrophthalmus* and *Tinca tinca*, and one *Carassius carassius*) from the Lake Bolshoi Ivan in the Pskov region included 13 monogenetic and 19 digenetic trematodes, seven cestodes, four nematodes and three acanthocephalans. The parasites are listed with details of their hosts and intensities of infection. The following pathogenic helminth species were present: *Dactylogyrus vastator*, *Ligula intestinalis*, *Neascus cuticola*, *N. brevicaudatum*, *Diplostomulum clavatum*, *D. spathaceum*, and larval *Triaenophorus nodulosus*. The parasite fauna of *Coregonus albula* and *L. lucioperca* was poor and these two fish are recommended for the stocking of other water reservoirs. G.I.P.

384—Ugeskrift for Laeger.

- a. MOSBECH, J., 1958.—“Forsøg på behandling af mepacrin og dichloropen *Taenia saginata* med.” 120 (22), 703-704.

(384a) 17 patients with *Taenia saginata* were treated with mepacrine; nine were cured by one course and three more by a second course of the drug. 23 patients were treated with dichlorophen and 16 relapsed. It is concluded that neither mepacrine nor dichlorophen is as effective as are male fern preparations. W.A.F.W.

385—Veterinaria. Sarajevo.

- a. VIŠNJAKOV, J., KOMANDAREV, S. & KOLEV, G., 1958.—“O terapiji ehinokokoze pasa.” 7 (3/4), 541-544. [English summary p. 541.]

(385a) Višnjakov *et al.* administered 40 mg. of acrichin per kg. body-weight *per os* to 24 dogs. Some animals had been fed *Echinococcus granulosus* cysts 32-34 days before and others 68-89 days before treatment. Two to four days after treatment those dogs harbouring adult worms, passed mature proglottides, whereas the animals harbouring immature *E. granulosus* did not pass either whole worms or proglottides. Acrichin given in the same way and at the same dose to 12 dogs naturally infected with *Dipylidium caninum*, *Mesocestoides lineatus* or *Taenia hydatigena* passed cestodes completely destroyed in four cases. 8 animals passed whole or parts of strobila but without scoleces. 33 dogs with *Echinococcus* received 3 mg. of arecoline per kg. body-weight. 64% of the animals were completely cured, while 90% of the total number of worms were expelled. The drug was intubated into the stomach. Arecoline administered *per os* with food to 81 dogs expelled 64% of cestodes but no animal was completely freed. N.J.

386—Veterinársky Časopis. Bratislava.

- a. SIMUNEK, J., 1958.—“Vliv přináší tekutého parafinu na účinky subkutanné splikovaného CCl_4 u ovci.” 7 (1), 96-110. [English, French, German & Russian summaries p. 109-110.]
 b. BREZA, M., 1958.—“Nález nematóda *Streptocara pectinifera* (Neumann 1900) v ČSR.” 7 (2), 187-191. [English, French, German & Russian summaries pp. 190-191.]
 c. KAŠTÁK, V., 1958.—“Pastvinné vodojemy a ich funkcia v epizootológii fasciolózy.” 7 (3), 290-292. [English, French, German & Russian summaries p. 292.]
 d. OŠMARÍN, P. G., OPARIN, P. G. & RUMMEL, A. G., 1958.—“Význam slimáka *Radix lagotus* v epizootológii hymenolepidózy domácích kačíc vyvolávanej *Hymenolepis microsoma*.” 7 (4), 307-312. [English, French, German & Russian summaries p. 312.]
 e. CHYSKÝ, V., 1958.—“Parasitosy importovaných opic.” 7 (4), 313-326. [English, French, German & Russian summaries pp. 325-326.]

(386a) Side effects due to subcutaneous application of carbon tetrachloride occurred in 40.32% of 62 sheep. Similar application of a mixture of carbon tetrachloride and liquid paraffin resulted in side effects in 45.6% of another 62 sheep. Therapeutic effects against fascioliasis were essentially the same with both pure carbon tetrachloride and when mixed with paraffin. N.J.

(386b) Breza reports on the finding of *Streptocara pectinifera* in a fowl. This is the first record of this parasite in Czechoslovakia. N.J.

(386c) Kašták reports that *Galba truncatula* was found in 88.39% of highland farms and in 34.42% of lowland farms. The snails were found in puddles, springs and shallow field wells with a population density of about 10 per sq. cm. Out of 68,392 specimens of various freshwater snails only *G. truncatula* was found to harbour larval forms of *Fasciola hepatica*. N.J.

(386d) Up to 100% of *Radix lagotus* collected in places frequented by ducks contained larvae of *Hymenolepis microsoma*. When the molluscs were fed to five ducks adult cestodes were obtained.

N.J.

(386e) Faecal examinations of 42 *Macacus rhesus* and autopsy of seven of them revealed infections with *Oesophagostomum bifurcum* (in 26.19%), *Strongyloides* sp. (in 50%), *Streptopharagus* sp. (in 4.76%) and *Trichuris trichiura* (in 31%). Post-mortem examinations of 40 *M. cynomolgus* that died in another consignment of 100, revealed the presence of these nematodes with the respective frequencies of 52.3%, 15%, 7.5% and 5%. *Characostomum asmilium* (in 2.5%), *Physaloptera* sp. (in 7.5%) and *Armillifer moniliformis* encysted larvae (in 5%) were also found.

N.J.

387—Wissenschaftliche Zeitschrift der Martin-Luther-Universität Halle-Wittenberg.

- a. DEUBERT, K. H., 1958.—“Zur Nematodenfauna der Luzerne.” 7 (3), 463-464.
- b. DEUBERT, K. H., 1958.—“Über den Einfluss von Roggen, Weizen, Rottkle und Kartoffeln auf die qualitative Zusammensetzung der Nematodenfauna.” 8 (1), 15-16.
- c. PAETZOLD, D., 1958.—“Beiträge zur Nematodenfauna mitteldeutscher Salzstellen im Raum von Halle.” 8 (1), 17-48.

(387a) Deubert gives the percentages of nematode species found associated with lucerne. Of these species *Rhabditis monhyphera*, *Panagrolaimus rigidus* and *Dorylaimus bastiana* account for some 40% of the total nematode population. These results are compared in tabular form with similar observations on nematodes associated with lucerne made by Belyaeva in 1951, Andrassy in 1952 [for abstracts see Helm. Abs., 20, No. 944q & 21, No. 592a] and Paesler in 1956.

D.J.H.

(387b) Deubert tabulates the percentages of various nematode genera found in soil with crops of rye, wheat, red clover and potatoes. *Tylenchorhynchus* is the most commonly occurring genus for all these four crops, amounting to 43.4% of the nematode population in red clover soil. It is supposed that the proportions of parasitic and saprozoic soil populations are influenced by the root density of the crops.

D.J.H.

(387c) Paetzold studied the nematodes found in salty areas around Halle, and recorded 80 different species which he lists according to particular locality, each of which is characterized. In addition, he describes and figures several new species, namely, *Protorhabditis lengerkemi* n.sp. which differs from *P. tristis* in the fine cuticular striation, the presence of six labial papillae and the presence of males; *Neocephalobus halophilus* n.sp. which differs from *N. aberrans* in the form of the male tail and number of post-anal papillae; *Tylenchus paragricola* n.sp. which differs from *T. agricola* in lacking head annules, in its size and relative spear length; *Tylenchorhynchus husingi* n.sp. which differs from *T. dubius* in that its head is not offset, from *T. eremiculus* in spear structure and the female tail and from *T. parvus* in the lip annulation; *Chromadorita gracilis* n.sp. [*C. gracilis* (Filipev, 1922), Filipev, 1930 already exists] which differs from *C. heterophya* in the shape of the head and the tail length; *Dorylaimus meyli* n.sp. [*D. meyli* Andrassy, 1958 predates this] which differs from *D. teres* in the male tail and shows considerable similarities to the genus *Thornia*; *D. parabastiani* n.sp. which differs from *D. bastiani* in the form of the female tail and the median, ventral pre- and post-vulval papillae; *D. subtiloides* n.sp. which differs from *D. subtilis* in the form of the spear and the number of caudal papillae, and from *D. parasubtilis* in the shape of head and spear; *Thornia regiusi* var. *magna* n.var. which differs from *T. regiusi* in size, amphid width and length of spear orifice; and *Nygolaimus paraaquaticus* n.sp. which differs from *N. aquaticus* in the form of pharynx and spear and the size of amphids. Two other new varieties are also described: *Monhyphera multisetosa* var. *hallensis* n.var. differs from the original species in the size and position of the side-organs; *M. stagnalis* var. *salina* n.var. differs from the original species in the size of the side-organs and the position of the ocelli. Numerous other known nematodes are described in further detail.

J.B.G.

388—Zeitschrift für die Gesamte Hygiene und ihre Grenzgebiete.

- a. SINNECKER, H., 1958.—“Zur epidemiologischen Bedeutung städtischer Abwasser bei der Verbreitung von zooparasitären Infektionsmöglichkeiten.” *4* (1/2), 98–115.

(388a) Sinnecker reports on investigations, carried out in several districts and between 1954 and 1956, into the possible dangers of transmitting helminths of man and animals by sewage. The important helminths of man found in sewage were: *Taenia saginata*, *Echinococcus granulosus*, *Ascaris lumbricoides* and *Trichuris trichiura*. Ova of *A. lumbricoides*, *T. trichiura* and cestodes were found in sewage even after purification. Of 66 sewermen, two were infected with *A. lumbricoides* and five with *T. trichiura*; for 25 sewage plant workers the figures were 4 and nil respectively; for 54 irrigation workers, 16 and 11; and for 90 other persons, 7 and 9. *A. lumbricoides*, *T. trichiura* and cestode ova were found on lettuces grown in sewage-irrigated fields. In one area (Cottbus) infection of cattle with *C. bovis* was found to be in 40% of cases caused by exposure to sewage, and 1·6% of cattle owners and their dependants had *Taenia saginata* infection; in another area (Görlitz) these percentages were 19 and 2·8 respectively. There are 100 references to earlier literature on the subject.

A.E.F.

NON-PERIODICAL LITERATURE

- 389—ANDRÁSSY, I., 1958.—“Szabadonélő fonálférgek—Nematoda libera.” In: Székessy, V., “Fauna Hungariae”. Budapest: Akadémiai Kiadó, Lief. 36, 362 pp.

This is a book of 362 pages, in Hungarian, in which are recorded 407 species of nematodes found in Hungary. A further 97 species, common in surrounding countries, are also included and the whole 504 are given short diagnoses and are differentiated by means of a continuous dichotomous key for each genus. There are no new species described. The book is illustrated by 92 plates of line drawings.

J.B.G.

390—COMPTE RENDU DU CONGRÈS DE L'ASSOCIATION SCIENTIFIQUE DES PAYS DE L'Océan Indien (3rd), Tananarive, Madagascar, October to November 1957.

- a. BUCK, G. & GRÉTILLAT, S., 1958.—“Les helminthes pathogènes des animaux domestiques à Madagascar.” Section B, pp. 97–112.
 b. GRÉTILLAT, S., 1958.—“Quelques filarioïses des animaux domestiques à Madagascar.” Section B, pp. 113–117.
 c. BRYGOO, E. R., 1958.—“La filarioïse à Madagascar et aux Comores.” Section G, pp. 83–85.
 d. RAMAMONJY-RATRIMO, H., 1958.—“Ankylostomiasis à Madagascar. Année 1957. Résumé.” Section G, pp. 87–89.
 e. BRYGOO, E. R., 1958.—“Mollusques et bilharzioses humaines à Madagascar. Résumé.” Section G, pp. 91–92.
 f. MORAIS, A. T. DE, 1958.—“The incidence and geographical distribution of human bilharziasis in Mozambique.” Section G, pp. 93–96.

(390a) Buck & Grétillat give a brief general account of the principal helminth diseases affecting domestic animals in Madagascar with notes on their distribution and pathogenicity. These include: *Metastrongylus salmi*, *M. madagascariensis*, *Choerostrongylus pudendotectus*, *Ascaris suum*, *Macracanthorhynchus hirudinaceus*, *Trichuris*, *Uncinaria stenocephala*, *Arduenna strongylina*, *Physocephalus sexalatus* and *Stephanurus dentatus* in pigs, *Neoascaris vitulorum*, *Haemonchus contortus*, *Oesophagostomum radiatum*, *Cooperia pectinata*, *Bunostomum phlebotomum*, *Paramphistomum cervi*, *Carmyrius spatiatus* and *C. dollfusi* in zebu, *Dictyocaulus viviparus* and *Moniezia expansa* in young bovines. *Eurytrema pancreaticum* has been reported from bovines from the east coast. Haemonchiasis is the dominant helminth disease in sheep; *Oesophagostomum columbianum* appears to have regressed during the last few years; *O. venulosum* is rare in sheep; *Moniezia expansa* and *Bunostomum trigonocephalum* also occur but liver-flukes have not established themselves as the intermediaries are lacking. In goats *M. expansa* is important. *Tricho-*

nema aegyptiacum occurs in equines and *Triodontophorus serratus*, *T. brevicauda* and *Strongylus edentatus* are recorded for the first time for this country in a horse. *S. vulgaris* and *S. equinus* are common, *Gastropiscus aegyptiacus* and *Parascaris equorum* also occur. Hookworms, *Spirocercus* and *Diphyllobothrium erinacei europae* are common in dogs, *Cysticercus pisiformis* and *Passalurus ambiguus* in rabbit, and *Tetrameris fissispina*, *Acuaria spiralis*, *Ascaridia galli*, *Heterakis gallinae*, *Amoebotaenia sphenoides*, *Echinostoma revolutum*, *Syngamus trachea* and, in the eye, *Oxyspirura* sp. are common in fowls.

S.W.

(390b) Grétillat discusses the filarial parasites of domestic animals in Madagascar. These are *Thelazia*, *Onchocerca bovis* and *Setaria labiata-papillosa* in bovines, *Dirofilaria immitis* in dogs and *Habronema megastoma* and *H. muscae* in horses. Their distribution, pathogenicity, life-cycle and symptoms are briefly mentioned.

S.W.

(390c) Brygoo reports the distribution of filariasis in man in Madagascar and Comores. In Madagascar more than 20,000 thick blood films were examined. Nocturnal periodicity in both areas was very marked; microfilariae only of *Wuchereria bancrofti* and *W. bancrofti* var. *vaucllei* were found. There is a vast focus along the whole of the east coast, with *vaucllei* predominating. In the north-west there is one focus in which both forms co-exist equally; this may be shown to be two foci, separated by zones not so far examined. A focus exists in the south-west where only typical *W. bancrofti* is found. Much work remains to be done. *Taeniorhynchus uniformis* is the vector. In Comores only typical *W. bancrofti* has so far been observed and *Culex fatigans* is the principal vector. Brief mention is made of the reports of filariae in wild animals in Madagascar.

S.W.

(390d) Ramamonjy-Ratrimo gives a brief historical account of ancylostomiasis in man in Madagascar. The distribution falls into two distinct regions—the major part of the east coast from Vangaindrano to Fénérive and that part north of a line between Majunga and Fénérive. In the west there has been no inquiry to date. In the south only negative results have been found. In the high plateau there are a few cases, probably imported from other regions. Almost all these observations, however, are based on faecal examinations of children. Differences in climate and geological formation may account for the distribution.

S.W.

(390e) Brygoo gives a brief account of the fresh-water molluscs reported in Madagascar—with particular reference to those implicated as schistosome intermediaries—and quotes from Ranson's report. Further work on the molluscs from 400 new locations will enable Ranson's work to be completed.

S.W.

(390f) In Mozambique, from 1952 to 1956, 66.17% of 15,279 urine specimens were positive for *Schistosoma haematobium* and 9.33% of 8,841 faecal specimens were positive for *S. mansoni*. In males the *S. haematobium* infection rate was 62.67% of 8,825 and in females 70.91% of 6,458, whereas the *S. mansoni* rates were 10.07% of 5,495 males and 8.1% of 3,342 females. Observations were based mainly on children and the results are tabulated under districts and administrative divisions, 421 localities having been investigated. The 11 to 15-year-old group was the most heavily infected with *S. haematobium* and the 16 to 20-year-old group with *S. mansoni*. The three to six-year-old group showed the least infection with both species.

S.W.

391—EUZÉBY, J., 1958.—“Prevention of parasitic diseases among sheep and cattle at pasture.” In: “Control of diseases in cattle and sheep at pasture”. Paris: European Productivity Agency of the Organization for European Economic Co-operation, pp. 21–40.

Euzéby summarizes methods of control of helminth parasites of sheep and cattle. He describes briefly general methods of flock and pasture management and suggests the use of a mixture of drugs for a multi-purpose vermicide for flock treatment. Some methods of destroying infective stages and intermediate hosts are given. The author stresses throughout that the methods suggested must be related to the special conditions and methods of husbandry which occur on individual farms.

H.D.C.

INDEXES

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NOTE

In all indexes the reference is to the serial numbers and not to the pages. Numbers in **bold** type indicate abstracts, and numbers in Roman type refer to title-only entries.

In the Author Index there are no cross-references to show joint authorship, but authors of joint papers are listed individually. Thus, a paper by "Brown, B., Jones, A. & Smith, J." would have three separate entries, "Brown, B.", "Jones, A.", and "Smith, J." but the serial numbers under the subsidiary authors are given in parentheses.

In the Index of Subjects, alphabetization is under the first word (e.g. "*Acer* sp." before "*Acerina* sp."). Under the generic name of a helminth the following order is observed: papers on the genus as such; papers on undefined species; papers on new and defined species, e.g.

- Capillaria*
- spp.
- *aerophila*
- *amarali* n.sp.

In cross-entries under names of hosts, the specific names of new species of helminths are now included. Hosts are indexed under their scientific names, where given, except domesticated animals (e.g. cat, pig, sheep), crop plants (e.g. oats, rye, tobacco), and where numerous hosts of the same group are listed in the one paper (e.g. amphibians, birds, cereals, legumes, mammals). The use of alternative scientific names for host or parasite is avoided wherever possible but in cases in which nomenclatorial or taxonomic confusion still exists the same organism may appear under more than one name.

Anthelmintics are listed alphabetically under that word, either by their trade name or by the active principle. There are no cross-references between proprietary drugs having the same or similar constituents and no classification of the drugs is attempted. They are also entered under the name of the parasite or disease and under the name of the host. For eelworms parasitic in or on plants they are entered alphabetically under *Nematicides* (*plant eelworm*) and under the name of the eelworm.

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